

7/PRIS

IMPROVED SYSTEM FOR ACQUIRING GEOPHYSICAL DATA

The present invention relates to systems deployed on-site on land or at sea for the acquisition of geophysical data.

These systems use an assembly of sensors, linked by electrical cables to casings whose role is to process the data emanating from the sensors, in particular by digitizing the data and transmitting them to a central processing unit to which the casings are also linked by electrical cables. These casings can also comprise means making it possible to test the operation of the sensors and the digitizing of the data.

The known systems are generally designed according to one of the following two architectures, which will now be explained with reference to Figures 1 and 2:

- monotrack architecture (represented in Figure 1),
- multitrack architecture (represented in Figure 2).

Figure 1 is a diagram representing a monotrack architecture. In this diagram, the geophysical data acquisition system S comprises a plurality of tracks $T(i)$, each of which consists of an assembly of geophysical sensors.

Such tracks $T(i)$ are well known and conventionally consist of n identical modules which each link in series or in parallel m geophysical sensors such as geophones whose analog output signal characterizes the response of the subsurface strata to the signal emitted following the activation of one or more seismic sources.

The monotrack system S also comprises casings $B(i)$ for digitizing the analog data emanating from the sensors of each track, and transmitting these data to storage

means (not represented in the figure). Each track $T(i)$ is thus linked to a respective casing $B(i)$ by a cable 10 connected to a port $P(i)$ of the casing, said cable conveying the analog data emanating from the sensors of the track $T(i)$.

The casings $B(i)$ comprise means for digitizing these analog signals, and for transmission to the storage means by way of a cable C which links the casings in series.

The cable C is composed of sections $C(i)$ conveying the digital signals emanating from the casings $B(i)$ as well as the electrical power supply required for the operation of these casings. Each section $C(i)$ is furnished at each of its two ends with a connector 20 for coupling R with a casing. Each casing $B(i)$ therefore comprises in addition to its port $P(i)$ two connectors for cooperating with the connectors 20 of two cable sections.

The diagram of Figure 2 represents a so-called "multitrack" or "N-track" system S' , according to the second type of architecture commonly employed.

The multitrack system S' comprises casings $B'(j)$ for digitizing and transmitting data, each casing being linked to N tracks $T(i)$ (4 tracks for each casing in the instance of the system represented here, but N -track systems in which N is equal to 6 for example are also commonly used). Each track is for its part linked to a single casing, by way of a cable 10 conveying the analog data emanating from the sensors of the track.

An important difference as compared with the monotrack system S represented in Figure 1 is that in the instance of the multitrack system, the cables 10 for

transmitting analog data are linked to the casings B'(j) not directly by a port, but by way of a main cable C' to which the casings are linked in series and to which the cables 10 are coupled by so-called
5 "take-outs" E(i) as they are widely known in the art.

The cable C' transmits, like the cable C of the monotrack system of Figure 1, the digital data emanating from the casings to storage means, not
10 represented in the figure.

An N-track system thus comprises N times fewer casings than tracks, each interval between two consecutive casings comprising N take-outs of which the first N/2
15 are linked to a first of the two casings, the other N/2 take-outs being linked to the second casing.

The cable C' of the multitrack system S' is more complex than the cable C of the monotrack system of
20 Figure 1. This cable C' thus comprises inside a single sheath:

- the extensions of the cables 10 for routing the analog data emanating from the tracks of sensors to the corresponding casing,
- 25 • conductors for transmitting digital data,
- at least one conductor for supplying power to the casings.

The casings B'(j) are linked to the cable C' by
30 connectors of the casing cooperating with matching connectors 20' of the cable C' so as to constitute couplings R'.

In the two known architectures described hereinabove,
35 the distance between two tracks T(i) is typically of the order of 50 meters. This distance is also that which separates two consecutive casings of a monotrack